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Predicting Adaptive Performance in Multicultural Teams: A Causal Model

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Air Force Research Laboratory
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ABSTRACT

The present study examines a causal model of adaptive performance in multicultural team settings. Dispositional traits are posited to influence adaptive performance through the mediating mechanisms of stress appraisals and self-efficacy. Beyond examining the causal paths associated with predictors, the study includes a commensurate focus on adaptability as an outcome and addresses the measurement issues that surround adaptive performance. Results support the posited causal model across divergent measurement methods for adaptive performance. Implications for the selection and training of multicultural teams, and directions for future research are discussed.

Multicultural teams have become the standard in business and governments around the world (Connaughton & Shuffler, 2007; Ilgen & Pulakos, 1999). This cultural diversity has created new work demands and placed greater emphasis on the need to be adaptable. Although adaptability is recognized as a crucial aspect of effective teamwork (Burke, Stagl, Salas, Pierce, & Kendall, 2006; Chen, Thomas & Wallace, 2005), particularly multicultural teamwork, a consistent definition and understanding of adaptability is absent in the literature (for a review see Stokes, 2008). Consequently, researchers often operationalize adaptability in terms amenable to their study, paying less attention to construct validity and diminishing our ability to compare results across studies. For example, adaptability can be construed as a predictor or an outcome. Further

complicating matters, researchers examining adaptability as an outcome have used differing measurement methods (e.g., Griffin & Hesketh, 2003; Kozlowski et al., 2001; LePine, 2005; Pulakos, Schmitt, Dorsey, Arad, Hedge, & Borman., 2002; Zaccaro & Banks, 2004). Considering the divergent approaches adopted, it is important to clarify the prediction of adaptability on both sides, predictor and outcome, and across measurement methods. Therefore, the intent of the present research is to examine a causal model of adaptive performance, combining the two most prominent outcome measures (subjective ratings and objective task scores), in an effort to ensure generalizability of results and offer clear guidance in terms of the selection and training of multicultural teams.

1.0 PREDICTING ADAPTIVE PERFORMANCE

There appear to be three general categories associated with predicting adaptive performance: cognitive, dispositional traits such as personality variables, and situational influences. General and specific cognitive abilities (e.g., Allworth & Hesketh, 1999; LePine, Colquitt, & Erez, 2000; Pulakos et al., 2002) and personality factors (e.g., Allworth & Hesketh, 1999; Griffin & Hesketh, 2003; LePine et al., 2000; Pulakos et al., 2002) have been consistently related to adaptive performance. Of the Big Five, the personality factors Openness to Experience and Neuroticism are the best predictors of adaptive performance (e.g., Allworth & Hesketh, 1999; LePine et al., 2000). Conscientiousness and Extraversion have received marginal support as predictors of adaptive performance (e.g., Griffin & Hesketh, 2003; Pulakos et al., 2002). Beyond the traditional, global constructs of cognitive ability and personality factors, unique predictors of adaptive performance have been identified, including change-related self-efficacy and prior experience with adaptive situations (e.g., Allworth & Hesketh, 1999; Griffin & Hesketh, 2003; Pulakos et al., 2002). Griffin and Hesketh (2003) have explored situational influences, finding that job complexity and management support influence adaptive performance.

1.1 An Adaptive Profile of Dispositional Traits

Although numerous predictors have been examined, it is not clear why they predict adaptive performance. A NATO research team attempted to determine the profile of an adaptive worker, revealing a three-factor indicator of adaptive performance (Svensson, Lindoff, Anderson, Norlander, & Sutton, 2005). Data collection sites were chosen based on their high need for adaptive performance in workers, although a criterion measure of adaptive performance was not assessed. The intent was to identify latent factors denoting an adaptive worker profile, not predict adaptive performance. This research examined numerous indicators of adaptability, including personality and cognitively-oriented variables. The data reduction and modelling efforts revealed that most indicators loaded on three factors: 1) Instability, 2) Adaptability, and 3) Need for Structure. *Instability* was composed of Fear of Invalidity and Neuroticism. *Adaptability* was composed of Emotion Regulation and Cultural Adjustment. *Need for Structure* was composed of Personal Need for Structure and Need for Cognitive Structure. (Each indicator is explained in more detail below.) Note that in these research efforts, adaptability has been designated and operationalized as a predictor variable (as opposed to an outcome variable). The present research expanded upon research by Svensson et al., (2005) by including a criterion measure of adaptive performance to provide predictive validity to the identified adaptive profile. In the present research adaptability as a predictor and adaptive performance as an outcome are operationalized as separate constructs, each with their own measurement scales. Adaptability is assessed by emotion regulation and cultural adjustment, and adaptive performance is assessed as an outcome measured by subjective performance ratings and objective performance scores.

1.2 Proximal Predictors of Adaptive Performance

Identification of predictive traits does not explain how or why such traits affect adaptive performance. To gain such an understanding, proximal predictors must be examined. Task specific stress appraisals, which

have yet to be examined in the context of adaptive performance, and adaptive specific self-efficacy are two such proximal predictors.

1.2.1 Stress Appraisals

As opposed to viewing the notion of 'fit' as determined solely by an observer, individuals themselves evaluate whether their skills and abilities are commensurate with the requirements of the situation. Such evaluations are referred to as stress appraisals (Lazarus & Folkman, 1984). Stress appraisals are comprised of two evaluative components: primary and secondary. Primary appraisals evaluate the personal relevance of a situation in terms of the potential threat it presents in relation to the individual's goals, values, and beliefs. Secondary appraisals evaluate one's resources for responding to the demands of the situation. The primary and secondary evaluative components combine to result in a continuum of appraisal outcomes where individuals range from being challenged to threatened (Blascovich & Mendes, 2000). Threat appraisals occur when individuals believe their resources, such as skills and abilities, are disproportionate to the demands of the situation. Challenge appraisals occur when individuals construe their resources as proportionate to or exceeding situational demands. Threat and challenge appraisals have been found to differentially affect performance and physiological responses (Schneider, 2004; Tomaka, Blascovich, Kelsey, & Leitten, 1993) and affective outcomes (Schneider, 2004).

Dispositionally adaptive individuals will likely appraise highly demanding and complex situations as a challenge, whereas non-adaptive individuals should appraise the situation as a threat. In accord with the notion of person-environment fit, adaptive individuals will have the appropriate abilities and other characteristics needed to respond to a complex situation. For example, adaptive individuals tend to be low in need for structure, embracing the uncertainty and spontaneous nature of changing situations (Svensson et al., 2005), and they are typically higher in cognitive ability. This low need for structure decreases the potential threat of adaptive situations (primary appraisal), and the higher cognitive ability serves as a coping resource (secondary appraisal). Thus, such individuals may appraise adaptive situations as a challenge, contributing to higher adaptive performance.

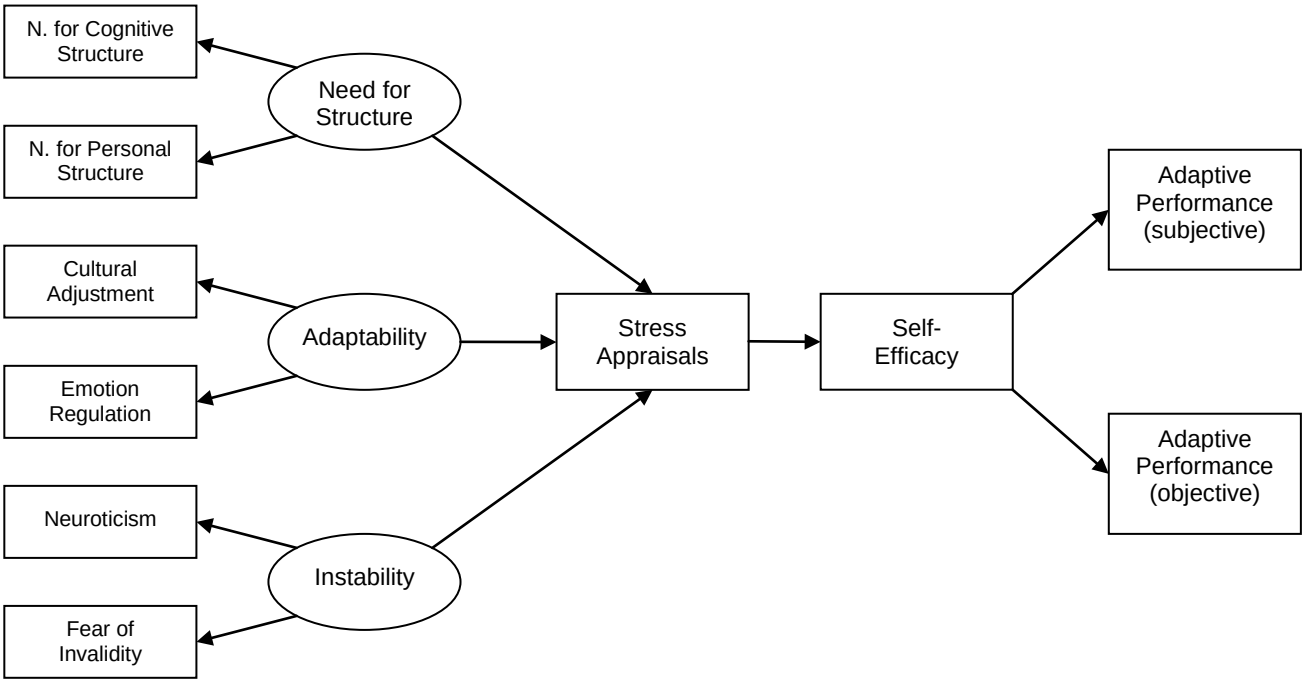
1.2.2 Self-Efficacy

Although self-efficacy has often been identified as a significant predictor of adaptive performance (Allworth & Hesketh, 1999; Griffin & Hesketh, 2003; Kozlowski et al., 2001; Pulakos et al., 2002), it has yet to be examined as a mediator of effects on adaptive performance. Research has indicated that self-efficacy often serves as a proximal predictor of general performance while other individual attributes tend to be distal, or antecedent to self-efficacy (e.g., Gist & Mitchell, 1992; Mathieu, Martineau, & Tannenbaum, 1993). The present research construed self-efficacy as a mediator of the effects of dispositional traits and stress appraisals on adaptive performance. As presented in Figure 1, dispositional adaptability (i.e., adaptive profile) is expected to influence individuals stress appraisals, which in turn influence self-efficacy, and ultimately adaptive performance.

In summary, the hypothesized model presented in Figure 1 clarifies the casual mechanisms through which adaptive performance is likely influenced. It expands upon previous research on dispositional adaptability, and posits the mediating variables (i.e., stress appraisals and self-efficacy) through which adaptive performance is enhanced. Further, by including two prominent measures of adaptive performance (subjective ratings and objective performance scores), we can investigate convergence of results.

Hypothesis 1: Stress appraisals and self-efficacy will mediate the relationship between dispositional adaptability and adaptive performance (subjective and objective) in multicultural teams.

Figure 1: Hypothesized Causal Model



2.0 METHOD

2.1 Participants

As part of a larger study, a total of 275 people (59% female) from a midwestern university population volunteered to participate in the study in exchange for course credit (200 subjects) or for monetary remuneration (75 subjects) in the amount of $30. The sample was culturally diverse with 64% Caucasian, 16% African American, 17% international students primarily from India, and 3% of other nationalities. The age distribution of the sample ranged from 18 to 49, mean = 21. Due to computer malfunctions, data involving objective adaptive performance were only available for 150 participants. As the focus of the present research is on multicultural teams, analysis of the hypothesized model presented in Figure 1 was limited to mixed culture teams only (N = 25 teams, 125 individuals).

2.2 Materials

2.2.1 Adaptive Profile

Considering Svensson et al.'s (2005) findings, the profile of an adaptive worker appears to be based on an amalgamation of various cognitive and affective components. To be an effective adaptive performer, one must have conducive information processing capabilities (e.g., low need for cognitive structure) as well as conducive personality characteristics (e.g., high emotional stability). Scales from the International Personality Item Pool – Five-Factor Model (IPIP-FFM), http://ipip.ori.org/, were used in the present study to assess neuroticism as an indicator of instability and openness as a component of cultural adjustment. Participants were asked to rate their agreement with each item based on a 5-point scale (1 = strongly agree, 5 = strongly disagree). The reliabilities were acceptable: Neuroticism α = .82 and Openness α = .76.

Consistent with Svensson et al., (2005), the validated measures of Need for Cognitive Structure, Personal Need for Structure, Personal Fear of Invalidity, Cultural Adjustment, and Emotion Regulation were used in the present research to assess various cognitive and affective indicators of an adaptive profile. As depicted in Figure 1, these measures were intended to serve as indicators of the aforementioned factor structure that captures the adaptive profile of an individual. However, the measurement model for the three-factor structure was not supported, and was therefore modified. The results of the factor analysis are reviewed in the following section.

2.2.2 Need for Cognitive Structure (NCS)

The NCS is a 20-item scale that assesses an individual's tendency to use cognitive structuring for decision-making, especially if the situation involves uncertainty. An example item is "I don't like to work on a problem that does not have a clear-cut solution." Participants rated their level of agreement with each item using a 5-point scale (1 = strongly disagree, 5 = strongly agree). Individuals high in NCS (e.g., those that would strongly agree with the example item) rely more on scripts, schemas, and past experiences to cognitively structure a situation in an effort to gain certainty (Bar-Tal, 1994; Svensson et al., 2005). Low NCS individuals use more complex decision-making processes, such as hypothesis generation, and they are more willing to re-evaluate a decision when presented with new information. The reliability for the scale was acceptable (α = .86), and a single composite score was calculated based on the average of all 20 items.

2.2.3 Personal Need for Structure (PNS)

The PNS is a 12-item scale that assesses the degree to which individuals prefer structure and clarity in situations and dislike ambiguity (Thompson, Naccarato, Parker, & Moskowitz, 2001). An example item is "I become uncomfortable when the rules of a situation are not clear." Participants rated their level of agreement with each item using a 5-point scale (1 = strongly agree, 5 = strongly disagree), and a single composite score was calculated based on the average of all items. The reliability in the present study was acceptable (α = .84). Note that a preference for structure is assessed by both the NCS scale and the Personal Need for Structure (PNS) scale. However, the NCS is more specific to decision-making activities, whereas the PNS assess a general preference for structure.

2.2.4 Personal Fear of Invalidity (PFI)

Individuals high in PFI are driven by a *concern* with committing errors when confronted with decision-making (Thompson et al., 2001). They tend to be preoccupied with the consequences and perceived risks associated with an undertaking and apprehensive of evaluation. In an effort to avoid potential mistakes, they may vacillate between options and resist commitment to situations or options, resulting in delayed responses (Svensson, et al., 2005). The PFI is a 14-item measure that uses a 5-point response scale (1 = strongly agree, 5 = strongly disagree). An example item is "I wish I did not worry so much about making errors." The reliability found in the present study was acceptable (α = .79).

2.2.5 Cultural Adjustment (CA)

The Intercultural Adjustment Potential Scale (ICAPS; Matsumoto et al., 2001) was developed as a generalizable measure of cultural adjustment. As opposed to assessing context- or cultural-specific knowledge or attitudes, ICAPS taps underlying psychological skills that facilitate adaptation and cultural adjustment. The 55-item scale taps four constructs that are purported to be necessary for effective intercultural adjustment: emotion regulation, openness, flexibility, and critical thinking. Emotion regulation is concerned with the experience of negative emotions and overly emotional reactions to the environment (example item: "I get angry easily"). Openness as measured by ICAPS is tantamount to the personality factor of openness to experience. Flexibility is intended to assess flexibility with regard to traditional ideas and social roles (example item: "I think women should have as much sexual freedom as men"). Finally, critical

thinking (or creativity) assesses a desire for self-direction and freedom from arbitrary constraint (example item: "The average citizen can influence governmental decisions").

In the interest of parsimony, the full 55-item ICAPS scale was not used in the present study. All items pertaining to the openness factor in ICAPS were excluded as the assessment of this factor was redundant with openness to experience as captured by the IPIP personality scale. Based on Matsumoto et al.'s (2001) results, only those items that exceeded their established criterion for factor loadings, ≥ 0.196, were included in the present study in an effort to increase reliability. Thus, for the remaining three factors, 9 items assessed emotional regulation, 6 items assessed flexibility, and 6 items assessed creativity. The factors of flexibility, creativity, and openness (as measured by the IPIP) were combined in a composite score representing cultural adjustment ($\alpha = .75$). As described below, the factor of emotion regulation will be extracted as a separate measure. Participants were asked to rate their agreement on a 5-point response scale (1 = strongly agree, 5 = strongly disagree).

2.2.6 Emotion Regulation (ER)

Consistent with Svensson et al., (2005), the ICAPS subscale assessing emotion regulation was used as a separate measure purported to load on the latent variable of adaptability (see Figure 1). The response scale is the same as reported above for the full ICAPS. High scores denote poor emotion regulation. The reliability was acceptable ($\alpha = .77$) after deleting the following item: "People should not care what other people do."

2.2.7 Stress Appraisals

As opposed to the two-item measure of appraisals used in previous research (e.g., Tomaka, et al., 1993), the present study used an expanded, ten-item measure of stress appraisals developed and validated by Schneider (in press). Seven items assessed primary appraisals (example item: "How threatening to you expect the upcoming task to be"), and three items assess secondary appraisals ("How able are you to cope with this task"). Participants were asked to respond on a 5-point response scales. As with self-efficacy, the stress appraisals scale was administered twice (following training and again following the first task session) to account for changes in appraisals due to continued task experience. The reliabilities for both administrations were acceptable: at Time 1, primary appraisals $\alpha = .74$, secondary appraisals $\alpha = .86$; at Time 2, primary appraisals $\alpha = .82$, secondary appraisals $\alpha = .88$. A ratio (primary/secondary) was calculated to yield an overall stress appraisal score. Using this ratio, high scores denote greater threat and lower scores denote challenge (a more adaptive evaluation).

2.2.8 Self-Efficacy

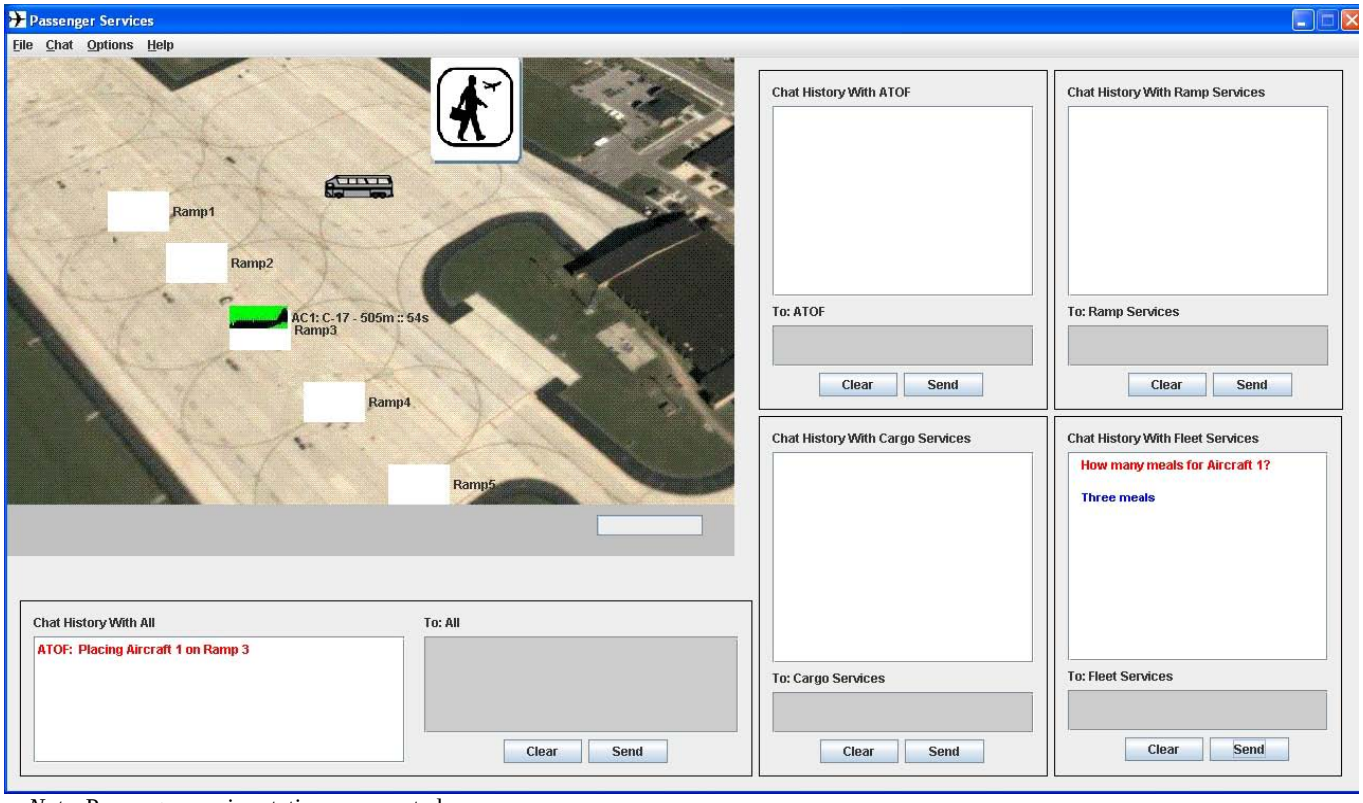
The measure used in the present study was based on the self-efficacy measure developed by Griffin and Hesketh (2003). The 14-item measure is specific to self-efficacy beliefs pertaining to adaptive behaviors and was developed to correspond to the dimensions of the adaptive performance taxonomy (Pulakos et al., 2000). The items were modified in the present study to align with the experimental task. Using a 5-point scale (1 = not at all confident, 5 = certain), participants rated their confidence in their being able to achieve each of the behaviors as they pertain to the task. For example, "Rate your level of confidence in being able to adjust to new processes or procedures" and "…form good relationships with people of different cultures." To account for changes in beliefs due to task experience, the scale was administered twice: once following the training session ($\alpha = .94$) and again following the first task session ($\alpha = .95$).

2.3 Task Apparatus

A team-based laboratory task, Computer-based Aerial Port Simulation (CAPS), developed by AFRL/RHAL was used as the research platform. The hardware included five networked PCs that participants used to

perform the task, and a sixth PC served as the experimenter station for data upload and scenario manipulation. The CAPS software is a computer-generated, five-player simulation program of the logistics operations associated with an aerial port squadron (Lyons, Stokes, Palumbo, Boyle, Seyba, & Ames, in press). A team was composed of five functional stations: (a) passenger services, (b) fleet services, (c) cargo services, (d) ramp services, and (d) air terminal operations flight (ATOF). The stations are interdependent, for example, fleet services cannot clean the aircraft until passenger services has unloaded all passengers. Similarly, cargo services cannot process in-bound cargo until ramp services transports and unloads the cargo. Thus, participants must coordinate and communicate their individual activities to achieve the shared goal of preparing aircraft for takeoff in sufficient time. Due to the high degree of communication required to complete this task, a vital component of the CAPS software is the instant message (IM) system. Participants are able to communicate needed information to other team members individually or globally (see screen display, Figure 2).

Figure 2: CAPS General Screen Display



Note. Passenger service station represented.

For the present study, the experimenter generated two 30-minute task sessions. The second session was more complex involving the repurposing of aircraft as well as a communication breakdown, which required adaptive responses from the participants. Specifically, for the third aircraft, an IM was sent to all team members that stated there had been a destination change and all passengers and cargo must be repurposed. That is, the passengers and cargo already loaded onto the aircraft had to be taken off the aircraft and new passengers and cargo for the revised destination had to be loaded. Further complicating matters, a communication breakdown in the IM system occurred 2 minutes into the repurposing event. With certain communication links down, participants had to reroute information through previously unused communication

paths. However, participants were not informed of this option. Rather, they had to discover, or adapt to, the situation on their own.

2.3.1 Adaptive Requirements

CAPS served as an excellent tool to assess adaptive performance as three aspects emphasize adaptability: (a) the repurposing of aircraft, (b) the communication breakdown, and (c) the interdependency of the task. Manipulation checks were created for the present study to ensure the adaptability requirements of the task were perceptible to the participants. The scale was administered twice, once immediately following the end of each task session. Based on a response scale ranging from 1 'not at all' to 5 'extremely', two items assessed perceived adaptability requirements: 1) In your opinion, how difficult was this task? 2) To what degree do you feel you had to adjust or adapt your behavior to cope with the task demands? In addition, two items assessed perceived task interdependence: 3) To what degree do you feel your performance on this task was dependent on the performance of your team mates? 4) To what degree do you think your team mates' performance would have suffered if you did not perform your job?

2.4 Performance

2.4.1 Objective Task Performance

Individual task performance scores were calculated per aircraft and adaptive event for each station based on requisite duties. A total of ten individual performance scores were calculated: five aircraft in Session 1, three aircraft in Session 2, one repurposing event in Session 2, and one communication failure in Session 2. The scores were then standardized to allow comparison across aircraft and adaptive events. Performance scores for the eight aircraft are considered standard performance as the situation was relatively static and consistent with the training scenario. Conversely, the performance scores for the repurposing and communication failure events are considered adaptive due to the increased complexity inherent in the events. As the communication failure overlapped the repurposing event, a composite score was created to represent adaptive performance.

2.4.1 Subjective Task Performance

Griffin and Hesketh's (2003) adaptive performance rating scale was used to obtain subjective performance scores. The rating scale is composed of twenty items which tap seven out of eight of the Pulakos et al., (2000) adaptive performance dimensions: handling crisis situations, problem solving, new learning, interpersonal adaptability, cultural adaptability, coping with uncertainty, and coping with stress. Similar to Griffin and Hesketh's study, the eighth dimension (i.e., physical adaptability) was excluded as it was irrelevant to task requirements. Participants were asked to rate their own performance as well as the performance of their four team mates using a 7-point scale (1 = performed very poorly, 7 = performed very well). An example item is "Integrated well with team mates of a different background or culture." A single-factor ANOVA was conducted to ensure similarity in ratings across self and peers. Ratings were not significantly different, $F(5, 1125) = 2.22$, $p > .05$, and were therefore collapsed to create a single adaptive performance rating per subject. The overall reliability of the rating scale was high ($\alpha = .97$).

2.5 Procedure

Experimental sessions, lasting approximately 2.5 hours, were composed of a single team of five participants. Each participant was randomly assigned to a task station, where they remained throughout the experimental session, completing all questionnaires and task activities. After obtaining participants' consent, they completed a battery of pre-task questionnaires including personality, need for cognitive structure, personal need for structure, personal fear of invalidity, cultural adjustment, emotion regulation, and standard demographics. All questionnaires were presented on the computer. After completing the pre-task questionnaires, participants received task instructions and training, followed by two 30-minute task sessions.

Following the training session, participants completed two more questionnaires (self-efficacy and stress appraisals) and then proceed on to the first 30-minute task session. At the end of Session 1, the self-efficacy and stress appraisals were administered again, along with the first administration of the manipulation check. After completion of the scales, participants began Session 2. Following Session 2, the manipulation check was administered again, and participants were asked to complete the subjective performance appraisal rating scale.

3.0 RESULTS

3.1 Manipulation Check

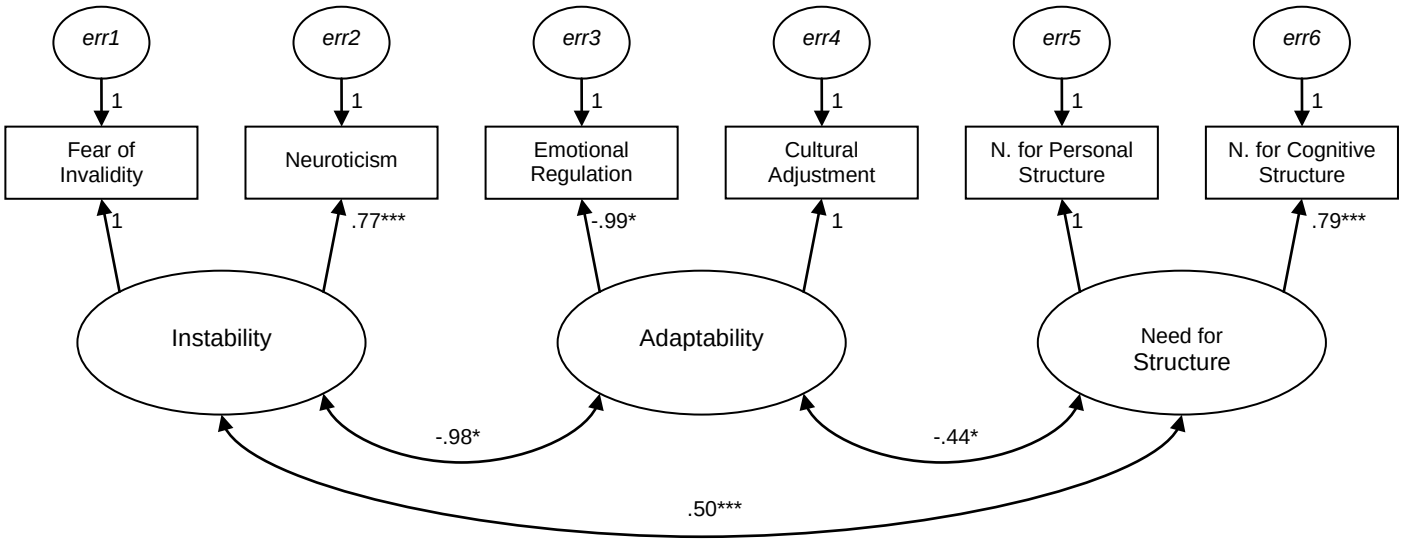
As expected, participants perceived the second task session (M = 3.03, SD = 1.15) to be significantly more difficult relative to the first session (M = 2.81, SD = 1.23; $t(230) = -2.57$, $p = .011$). Moreover, the participants reported the second session (M = 3.55, SD = 0.96) as requiring significantly more adaptive behavior relative to the first session (M = 3.09, SD = 1.07; $t(226) = -5.78$, $p = .000$). As a high degree of task interdependence was inherent in both sessions, there was not a significant difference reported for the average of items 3 and 4: M = 4.15, SD = 0.84 (session 1); M = 4.13, SD = 0.84 (session 2); $t(226) = 0.27$, $p = .787$. Thus, consistent with the intent of the task design, the second session was more difficult and required an adaptive response, which was indeed perceptible to the participants.

3.2 Adaptive Profile Measurement Model

As mentioned previously, the measurement model for the three-factor structure of Instability, Need for Structure, and Adaptability was not supported. The results of a CFA conducted using the AMOS statistical program (Arbuckle, 1997) indicated that the three-factor structure as depicted in Figure 3 did not fit the data well: N = 263, $\chi^2(6) = 41.89$, $p < .001$; CFI = .94, NCP = 35.9, RMSEA = .15 with confidence intervals ranging from .11 to .19 and PCLOSE = .00. Given the strong correlation (r = .80) and conceptual similarity of Matsumoto et al.'s (2001) emotion regulation measure and the FFM personality measure of neuroticism, it is theoretically plausible that these two measures tap the same latent factor, namely instability. In addition, the residual covariance matrix indicated a high degree of covariance between the cultural adjustment scale with need for personal structure (-5.14) and with need for cognitive structure (-4.52), both exceeding the cut point of 2.58 (Byrne, 2001). Such results suggest that switching the loading for cultural adjustment to the need for structure latent variable would be more representative of the population data.

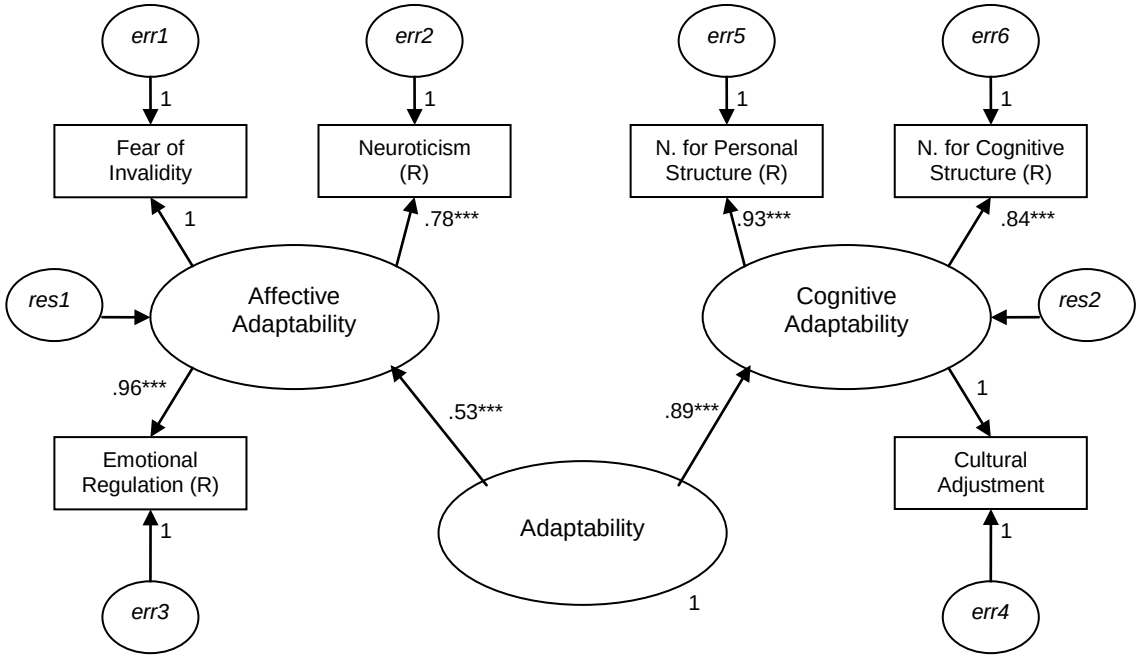
Based on the above results and verifying conceptual clarity, the measurement model was respecified as a second-order model (Figure 4). Need for structure was reconceptualized as 'cognitive related adaptability' and instability was reconceptualized as 'affective related adaptability.' Both factors in turn are indicators of the second order construct of adaptability, which represents general adaptive tendencies. Need for cognitive structure and need for personal structure were reversed scored, with positive scores denoting less preference for structure, to align with the cultural adjustment scale and load positively on 'cognitive adaptability.' Similarly, neuroticism, fear of invalidity, and emotional regulation were reversed scored so as to load positively on 'affective adaptability.' To ensure the higher order structure was identified, equality constraints were placed on the higher order residuals after verifying their similarity: discrepancy of .01 in estimated variances with a critical ratio < 1.96, suggesting the two residual variances are equal in the population. The respecified model resulted in a significant reduction in the model's chi-square: $\chi^2_{difference}(2) = 32.37$, $p < .001$. In addition, the fit indexes for the respecified model were superior and indicated good fit: N = 263, $\chi^2(8) = 9.52$, $p = .30$; CFI = .99, NCP = 1.5, RMSEA = .03 with confidence intervals ranging from .00 to .08 and PCLOSE = .70.

Figure 3: Confirmatory Factor Analysis for the Proposed Adaptive Profile (Svensson et al., 2005)



Note. * $p < .05$, *** $p < .001$. Standardized estimates reported.

Figure 4: Respecified Measurement Model for an Adaptive Profile



Note. *** $p < .001$. Reversed scores, (R), were calculated for several measures to reflect positive loadings for all paths.

3.3 Hypothesized Causal Model of Adaptive Performance

The statistical program AMOS was also used to analyze the proposed structural equation model presented in Figure 1, the results of which are presented in Figure 5 and Table 1. Note that the respecified second-order measurement model replaced the original measurement model depicted in Figure 1. As both subjective and objective adaptive performance (AP) measures are intended to capture the same underlying construct the AP measures likely share a common omitted cause, therefore their disturbance terms were permitted to covary (Kline, 1998).

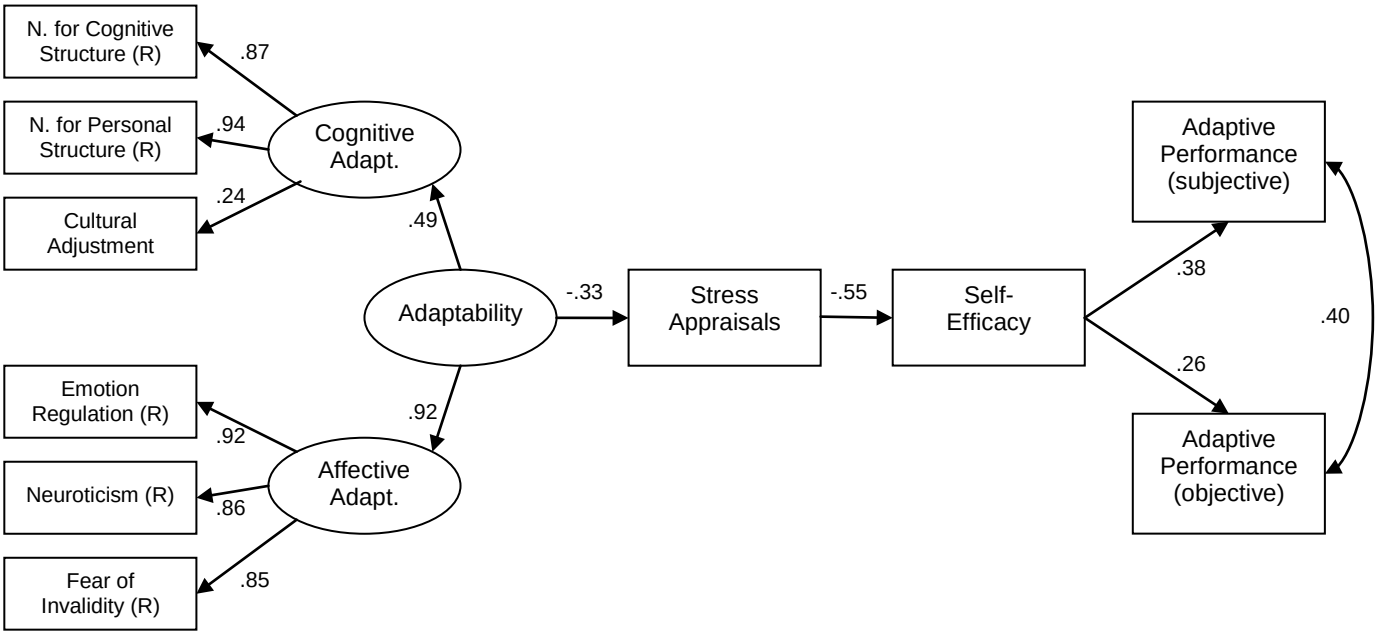
To test for mediation, an indirect effects model with all possible paths specified was compared to a direct effects model, where only direct paths from all variables to subjective and objective AP were specified. The direct effects model did not fit the data well: $N = 125$, $\chi^2(31) = 89$, $p < .001$; CFI = .87, NCP = 57.8, RMSEA = .12 with confidence intervals ranging from .09 to .15 and PCLOSE < .001. The indirect effects model indicated superior fit: $N = 125$, $\chi^2(28) = 30$, $p = .36$; CFI = .99, NCP = 2.1, RMSEA = .03 with confidence intervals ranging from .00 to .08 and PCLOSE = .74. Furthermore, the chi-square difference test of the two models indicated that the indirect effects model was a significant improvement in data representation: $\chi^2_{difference}(3) = 59$, $p < .001$. In accord with Kline (1998), strong support for mediation was further indicated by significant indirect paths relative to non-significant direct paths from adaptability and stress appraisals to subjective and objective AP. Given the non-significant direct paths, a final trimmed model with the direct paths eliminated was analyzed (Figure 5). The trimmed model did not differ from the full indirect effects model, $\chi^2_{difference}(5) = 7$, $p > .05$, and therefore supports the hypothesized model. Table 1 summarizes the fit indexes for all models analyzed, and Table 2 presents the results of the significance tests for indirect effects.

Table 1: Summary of Model Fit Indexes

Model (N = 125)	χ^2	df	Contrast with preceding model		CFI	NCP	RMSEA (C.I., PCLOSE)
			$\chi^2_{difference}$	$df_{difference}$			
Direct effects	89***	31	--	--	.87	57.8	.12 (.09-.15, .00)
Indirect effects	30^{ns}	28	59***	3	.99	2.1	.03 (.00-.08, .74)
Hypothesized model	37^{ns}	33	7^{ns}	5	.99	4.2	.03 (.00-.08, .71)

Note. ***$p < .001$, ^{ns} = not significant. Desired fit indexes: CFI > .95; NCP = small values; RMSEA < .05 good fit, > .10 poor fit, narrow confidence interval (C.I.), PCLOSE > .50.

Figure 5: Results for the Hypothesized Causal Model of Adaptive Performance



Note. All paths are significant at $p < .01$. (R) = reversed scored. Standardized estimates reported. Error and residual terms were include in the analysis but are not depicted above due to space constraints.

Table 2: Tests of Significance for Indirect Effects

	Endogenous variable	
Causal variable	Objective AP	Subjective AP
Self-efficacy		
Direct effect	.26**	.38***
Stress appraisals		
Indirect via self-efficacy	-.14**	-.21***
Adaptability		
Indirect via stress appraisals and self-efficacy	.05**	.07**

Note. ** $p < .01$, ***$p < .001$. Standardized estimates reported. The procedure indicated in Kline (1998) was used to test the significance of indirect effects.

4.0 DISCUSSION

The results of the present research offer theoretical support, clarification, and guidance in several areas: 1) support and refinement of Svensson et al.'s (2005) identification of dispositional traits indicative of an adaptive profile, and confirmation that the profile predicts adaptive performance; 2) established the predictive validity of a new variable (stress appraisals) in adaptive performance research; and 3) identified a model reflecting the causal relationships and mechanisms through which adaptive performance is influenced.

Several dispositional traits were identified by Svensson et al., (2005) as indicators of a latent three-factor model intended to reflect an adaptive profile. Although the configuration specified by Svensson et al., was not supported, a respecified second-order model with the same trait indicators was supported. Svensson et al.'s original model (Figure 3) posited three first-order factors labelled Instability, Need for Structure, and Adaptability. However, as adaptability is ultimately what we are trying to describe, the present research represented general adaptability as a higher-order factor with the latent indicators of affective adaptability and cognitive adaptability. In addition to identifying a better model statistically, the respecified model offers conceptual clarity by acknowledging a mutual cognitive and affective related influence on beliefs, attitudes, and behavior.

Although results supported a latent factor model indicative of an adaptive profile, it did not guarantee prediction of adaptive behavior. Therefore, the respecified adaptive profile was included in the examination of a causal model of adaptive performance. As opposed to exerting a direct influence on adaptive performance, the adaptive profile was posited to have an indirect influence on adaptive performance operating through the proximal mechanisms of stress appraisals and self-efficacy. The posited causal model was supported, which confirmed the predictive validity of the dispositional traits associated with the adaptive profile.

Beyond support for the predictive validity of the adaptive profile, the results also supported stress appraisals as a valid predictor of adaptive performance. Although stress appraisals have yet to be examined in the domain of adaptive performance, they have been found to predict performance in other domains (Schneider, 2004; Tomaka, et al., 1993). Stress appraisals, construed as threat and challenge appraisals, are based on evaluations of whether individuals' skills and abilities are commensurate with the requirements of the task or situation. Given that the evaluative component is based on a comparison of the self with the task at hand, the present research hypothesized stress appraisals would operate as a causal mechanism, mediating the influence of dispositional traits on adaptive performance. The posited mediated relationship was supported; the more adaptable individuals' dispositional tendencies, the less likely they will appraise the task as a threat, thereby increasing adaptive performance.

Offering further clarification of causal relationships, self-efficacy was also posited as a proximal mediator. Although stress appraisals are task specific, self-efficacy as measured in the present research was specific to an individual's belief in coping with situations that require a high degree of adaptability. Thus, as the intent of the present research was to identify a causal model of adaptive performance, as opposed to general task performance, self-efficacy was posited as the most proximal mediator to adaptive performance. Thus, the support of the causal model in the present research offers a clear delineation of the antecedents and causal mechanisms that influence adaptive performance. Individuals go into an adaptive situation with certain dispositional tendencies that are more or less 'adaptable.' Such tendencies contribute to appraisals of the situation as either a challenge or a threat, which in turn, influence an individual's self-efficacy beliefs specific to adaptability, and ultimately influence their behavior in terms of adaptive performance.

4.1 Implications

The results of the present research offer guidance in terms of selection and training directed and increasing adaptive performance, specifically in multicultural teams. The present sample consisted of mixed culture teams performing a task that required a high degree of adaptability. Thus, not only did participants have to adapt to the changing task requirements, they had to also adapt their interpersonal interaction based on the differing cultures of their team mates. Consistent with Matsumoto (2007), the focus of the present research was on the underlying dispositional traits associated with different cultures, not culture defined as nationality. Such an approach permits acknowledgment of the subtleties and variability inherent in cultures (Connaughton & Shuffler, 2007). Furthermore, it offers identification of the dispositional traits that serve to impede or benefit the effectiveness of multicultural teams, specifically in terms of adaptability. With an understanding of the dispositional tendencies, training interventions can be targeted at improving adaptive performance. Although it is possible to modify culturally associated dispositional traits given development and appropriate environmental interactions (Matsumoto, 2006), the causal model supported in the present research offers stress appraisals and self-efficacy as additional, more malleable, targets for training interventions. Furthermore, as the dispositional traits do not directly influence adaptive performance, training directed at stress appraisals and self-efficacy would likely be more effective. However, future research should empirically examine this assertion. For example, would the effects on adaptive performance be similar given two samples matched on adaptable dispositional traits, but with and without training interventions aiding in stress appraisals and/or self-efficacy.

4.2 Limitations

Although a focus of this research was to address limitations in previous research, namely the measurement issues associated with adaptive performance, the present research had its own limitations. For example, the data collection was performed in a laboratory setting, using a laboratory task. Research is needed that confirms generalization of results to a field setting, particularly given the culturally related issues. Matsumoto (2006) noted that culture is likely to have a greater influence on self-report data as opposed to actual behavior. Another limitation was the neglect of situational influences on adaptive performance. Although it was beyond the scope of this study, future research should explore situational variables as potential moderators of adaptive performance.

4.3 Conclusion

In summary, the findings verify the convergence of a causal model of predictors for disparate measures of adaptive performance, thereby providing clear and consistent guidance for the selection and training of multicultural teams. Furthermore, support was provided for dispositional traits identified as a latent adaptive profile (Svensson et al., 2005), which in turn predict adaptive performance through the causal mechanisms of stress appraisals and self-efficacy. Several new research directions were explored and supported in the present research: the combined examination of subjective and objective measures of adaptive performance, stress appraisals examined as a predictor/mediator of adaptive performance, self-efficacy examined as a mediator of adaptive performance, and finally, the relationships between all variables delineated in a causal model predicting adaptive performance. As this was a preliminary examination of new research directions, given the promising results, future research is needed to further explore, confirm, and extend the present findings.

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